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SOund Fixing And Ranging beneath sea-ice

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SOund Fixing And Ranging techniques, the so-called SOFAR technique, is widely used in the field of oceanography for tracking neutrally buoyant floats underwater over large distances (several thousands of kilometres) and for long periods of time (several years). The range propagation depends largely on the existence or not of the SOFAR sound channel. Twenty years ago we investigated SOFAR acoustic propagation under sea-ice over large distances and at various frequencies from 80hz up to 1560 hz. We discovered the range for acoustic propagation was much reduced (100 kms to 150 kms) no matter the frequency used. This was due to large scattering induced by under sea-ice topography since there is no way to avoid acoustic rays to bounce back to the surface towards sea-ice and create multiple reflections. More recently during the Tara Damocles transpolar drift across the Arctic Ocean, we reinvestigated the SOFAR acoustic range propagation under sea-ice for longer periods of time in various conditions (summer and winter conditions). Our results confirmed those obtained 20 years ago and indicated a high sensitivity to the ambient conditions. We are presenting the results obtained during the late fall- early winter months of the Tara transpolar drift across the Arctic Ocean.